R E M A R K S

The independent claims, namely, claims 1, 7, 11, 13 and 14 have been amended to more precisely define the invention. Claims 1 - 24 are pending in the application.

The language added to the claims comes from the specification in the paragraph bridging pages 9 and 10 reading:

> The invention advantageously uses the instantaneous physical layer information on transmission rates to provide control of the ATM layer congestion control loop, in advance of the onset of congestion and cell loss.

Claim 1 and Claim 7 stand rejected under 35 U.S.C. §102(e) as being anticipated by Meurisse et al. (US 5,959,973), and this ground of rejection is respectfully traversed.

Figure 1 of Meurisse et al. is reproduced as follows for convenience of reference:

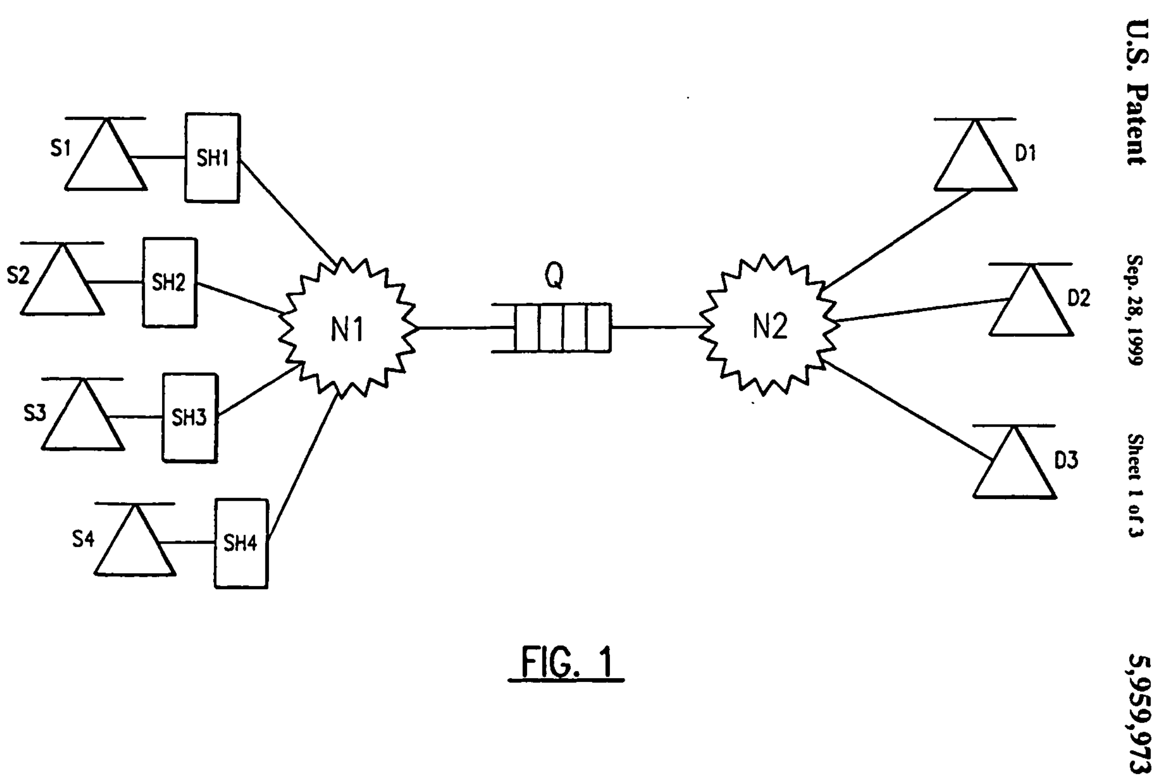

FIG. 1

The measurements at the queuing network node Q is described in the abstract as follows:

[57] **ABSTRACT**

As long as a queuing network node (Q) is not congested, it returns to the source terminals (S1, S2, S3, S4) transmitting data packets through this queuing network node (Q), upper packet rate values (ER) which are proportional to the actual packet rate values (CCR). The transmit rate of a source terminal (S1, S2, S3, S4) upon receipt of the upper packet rate value (ER), is controlled so that it stays below this upper packet rate value. In this way, the queuing network node (Q) allows its aggregate input rate to increase in a controlled, smooth way and does not rely on the sources (S1, S2, S3, S4) themselves. Once the queuing network node (Q) gets congested a fair share algorithm is used to determine which source terminals have to decrease their transmit rates and which source terminals are allowed to further increase their transmit rates.

The measurement at the queuing network node Q does not appear to be in any manner, fashion or form affected or influenced by actual conditions of the transmission link itself, temperature variations and/or electromagnetic interference. It is controlled by the transmit rate of the sources. As stated in the abstract, the upper packet rate value (ER) is controlled so that it stays below this upper packet rate value:

> In this way, the queuing network node (Q) allows its aggregate input rate to increase in a controlled, smooth way and does not rely on the sources (S1, S2, S3, S4) themselves. Once the queuing network node (Q) gets congested a fair share algorithm is used to determine which source terminals have to decease their transmit rates and which source terminals are allowed to further increase their transmit rates.

-- no hint whatsoever of any influence of the changes in the physical layer affecting the transport rate of the transmission link.

Clearly, the Examiner's extrapolations regarding Meurisse et al. are not relevant to applicants' invention.

The Examiner makes the statement at the bottom of page 2 and again in the Response to Arguments section on page 9 that: "Every transmission link inherently has a physical layer transport rate that is subject to variations due to actual conditions of the transmission link itself, temperature variations, and/or electromagnetic interference." Although this may well be true, there is nothing in Meurisse et al. that would provide any teaching or suggestion on how to deal with any variation in the physical layer transport rate. Meurisse et al. deals strictly with resource management cells which are transported through the network and are used to measure congestion levels at queuing nodes within the network. There is no teaching or suggestion that the resource management cells carry information relevant to the physical layer transport rate or that they report any abrupt change or interruption in the transport rate.

Claims 2 - 5, 8, 9, 11, 13 and 22-24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Meurisse et al., and this ground of rejection is respectfully traversed.

With respect to the rejection of claim 2 under 35 U.S.C. §103(a), the Examiner indicates that Meurisse et al. fails to teach

that the management cells are generated in response to changes in measured transport rate above or below the threshold and then concludes that it would have been obvious to one of ordinary skill in the art to modify the teaching of Meurisse et al. so that the management cells are generated in response to changes in measured transport rate above or below a threshold because such an arrangement helps to minimize unnecessary traffic. The Examiner then goes on to say that, when the transport rate is estimated over time intervals of fixed length, such an arrangement allows the effective time delay across the network to be minimized by allowing the destination terminal to estimate, based on the estimated rate of change of transport rate, the present transport rate at the source terminal. It is not clear where the Examiner gets this allegation, but it seems that if the resource management cells are sent at regular time intervals (see column 5, lines 34 and 35), and if these time intervals are based on a round trip time, i.e. 2 milliseconds (column 6, lines 1 and 2), then a change in the physical layer transport rate would interfere with the round trip time and as a result change the frequency or at least the interval of the RM cells. In the present application, and in particular claim 2, the RM cells are sent or generated in response to a monitored change in the physical layer transport rate and not at a fixed time interval as taught by Meurisse et al.

Regarding the Examiner's comments concerning claims 11 and 13, it will be noted that these claims have been amended to recite that

the instantaneous physical layer transport rate is monitored and the management message contains rate information based on the monitored instantaneous physical transport rate and that the transmission rate responsive to the rate information is contained in the management message in advance of the onset of congestion and cell loss.

The "instantaneous" language is not in claim 13. It has been shown above how it is that Meurisse et al. fails to disclose applicants' method of monitoring the effect of actual conditions of the transmission link itself, temperature variations and electromagnetic interference on the transmission rate. The Examiner refers to columns 1, 2, 3, 5, 6 and 7 of the Meurisse et al. reference and contends that the "data flow control packet" of Meurisse et al. are the equivalent of applicants' "management cell", and this is not the case. Meurisse's "data flow control packets" contain information regarding the "actual packet rate" of data transmitted <u>over the queuing network connection</u> which is a function of the <u>congested state of the queuing network</u>. It is obviously not the equivalent of applicants' management message which includes rate information based on the monitor transport rate, which message is used to adjust the upstream source transmission rate in response to the rate information in the management message in advance of the onset of congestion and cell loss.

The same goes for claim 13.

Referring to the Examiner's comments concerning claims 22 - 24 that Meurisse et al. fails to teach that the management message is contained in a management cell; the rate information is new rate information; and that the rate information is rate adjustment information. As shown above, Meurisse et al. also fails to teach the measurements of the physical layer transport rate in the manner recited in the parent claims.

Claims 6, 10 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Meurisse et al. in view of Chang et al. The Chang et al. paper deals with an ATM network which consists of switches using different rate control mechanisms: "namely, the Explicit Forward Congestion Indication (EFCI) mode and the Explicit Rate (ER) mechanism." As described in column 2 of Chang et al., an EFCI switch is one that:

> ... when in a congested state, it sets the EFCI bit in the header of all data cells forwarded to its destination. The destination will in turn convey the information back to the source in the RM cell. Also, an EFCI switch may optionally set the congestion bit in the returning RM cell to throttle the source rate. An ER switch is an intelligent switch in that it monitors its traffic and calculates an average fair share of its capacity per active virtual circuit (VC) flow. This quantity is called explicit rate and is given to each active source in its returning RM cells.

Nothing is said in Chang et al. or in Meurisse et al. about monitoring the physical layer transport rate of the physical layer transmission link and recording the value derived therefrom in the RM cell and returning the RM cell including the monitored value to the upstream and adjusting the upstream source's transmission rate

in response to the recorded value in the RM cell in advance of the onset of congestion and cell loss. Applicants respectfully submit that the Examiner's extrapolations regarding Meurisse et al. and Chang et al. are based on applicants' teaching and not on what these references teach or suggest one skilled in the art.

The rejection of claim 12 under 35 U.S.C. §103(a) as being unpatentable over Meurisse et al. as applied to claim 11 and further in view of Chang et al. is respectfully traversed.

Applicants agree that Chang et al. discloses a rate-based flow control mechanism in ATM networks which controls the transmission rate of available bit rate (ABR) traffic sources based on feedback information contained in the resource management (RM) cells coming from the destination and/or network switching nodes. However, Chang et al. does not fill the gap. There is no disclosure of monitoring change in the physical layer.

The rejection of claims 15 - 20 under 35 U.S.C. §103(a) as being unpatentable over Meurisse et al. and Chang et al. as applied to claim 14 further in view of the Admitted Prior Art is traversed. Initially, applicants' observe that these claims are patentable for the reasons that the claim from which they depend are patentable, namely, the Examiner has failed to disclose prior art in which the transfer characteristics are controlled based on dynamic adaptation to the physical layer rate variation. In particular, measurement of congestion at a queue point is not measurement of the physical layer transport rate that is subject to variation due to actual

conditions such as temperature variations and/or electromagnetic interference. Even if such interference is inherent, the art fails to teach monitoring or measurement of the instantaneous physical layer transport rate and sending to the upstream source a management message including rate information based on the monitored instantaneous physical layer transport rate and adjusting the upstream source's transmission rate responsive to the rate information in the management message in advance of the onset of congestion and cell loss.

In view of the above, further and favorable reconsideration is respectfully requested.

Respectfully submitted,

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Attachment: VERSION WITH MARKINGS TO SHOW CHANGES MADE

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Date: February 19, 2003

In the event this paper is deemed not timely filed, the applicant hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 26-0090 along with any other additional fees which may be required with respect to this paper.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1, 7, 11, 13 and 14 have been amended as follows:

1. (Twice Amended) In a communications system for transporting data traffic downstream from an upstream source over a path which includes a transmission link having a physical layer transport rate which is subject to variations as a function of time due to actual conditions of the transmission link itself, temperature variations and/or electromagnetic interference, a method of managing transmission of the data traffic through the system, the method comprising: the steps of: monitoring the instantaneous physical layer transport rate of said transmission link; sending to said upstream source a management message including rate information based on the monitored instantaneous physical layer transport rate; and adjusting, by said upstream source, said transmission rate responsive to the rate information in said management message in advance of the onset of congestion and cell loss.

7. (Twice Amended) In a communication system for transporting data traffic downstream from an upstream source over a path which includes a transmission link having a physical layer transport rate which is subject to variations as a function of time due to actual conditions of the transmission link itself, temperature variations and/or electromagnetic interference, a

method of managing transmission of the data traffic through the system, the system comprising: monitoring means associated with the physical layer to monitor the transport rate of said transmission link; sending means to send to said upstream source a management message including rate information based on the monitored <u>instantaneous</u> physical layer transport rate; and adjusting means, at said upstream source, to adjust said transmission rate responsive to the rate information in said management message <u>in advance of the onset of congestion and cell loss</u>.

11. (Three times amended) In a communications system for transporting data traffic downstream from an upstream source over a path which includes a transmission link having a physical layer transport rate which is subject to variations as a function of time due to actual conditions of the transmission link itself, temperature variations and/or electromagnetic interference, a method of managing transmission of the data traffic through the system, the method comprising: continually monitoring the <u>instantaneous</u> physical layer transport rate of said transmission link; generating a management message in response to a change in said monitored physical layer transport rate which exceeds a threshold value, said management message including rate information based on said monitored transport rate; sending to said upstream source said management message; and adjusting said upstream source transmission rate in response to the rate information in the

management message in advance of the onset of congestion and cell loss.

13. (Three times amended) In a communications system for transporting data traffic downstream from an upstream source over a path which includes a transmission link having a physical layer transport rate which is subject to variations as a function of time due to actual conditions of the transmission link itself, temperature variations and/or electromagnetic interference, a system for managing transmission of the data traffic through the system, the system comprising: monitoring means for monitoring the physical layer transport rate of said link; generating means to generate a management message in response to a change in said monitored physical layer transport rate which exceeds a threshold value, said management message including information based on said monitored transport rate; means to send said management message to said upstream source; and adjusting means at said upstream source to adjust said transmission rate in response to the rate information in the management message in advance of the onset of congestion and cell loss.

14. (Three times amended) In a communications system for transporting data traffic downstream from an upstream source over a path which includes a transmission link having a physical layer transport rate which is subject to variations as a function of time due to actual conditions of the transmission link itself,

temperature variations and/or electromagnetic interference, a method of managing the transmission of data traffic through the system, the method comprising: shaping a data connection from the source to the available bit rate (ABR) category of service, the ABR connection including integrated resource management (RM) cells for carrying congestion information back to said upstream source over a feedback path; monitoring the physical layer transport rate of said physical layer transmission link and recording a value derived from said monitored rate in said RM cell; returning said RM cell including the recorded value to said upstream; and adjusting by the upstream source the transmission rate in response to the recorded value in the RM cell <u>in advance of the onset of congestion and cell loss</u>.